

MIGRATION OF *EUPLOEA CORE CORINNA* (W.S. MACLEAY) (NYMPHALIDAE: DANAINAE) IN NORTHERN QUEENSLAND, AUSTRALIA

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Abstract

A large-scale north-westerly movement of *Euploea core corinna* is recorded from northern Queensland. Butterflies moved consistently in a WNW direction at Townsville from at least mid-May to mid-June 1990. Females were relatively 'fresh' in wing condition and reproductively dormant. Flight activity occurred predominantly during warm sunny periods and ceased on cloudy days. The number in flight reached a maximum in late-May when approximately 2000 individuals crossed a 50 m transect per hour.

Introduction

Very little is known about the movement patterns of the common crow butterfly, *Euploea core corinna*, in Australia, especially from the northern tropical areas of its range. Kitching and Zalucki (1981) stated that *E. c. corinna* was a non-migrant but Smithers (1983), in a review of the movement patterns of *E. c. corinna*, suspected that the species, like many other danaids in Australia, was migratory but as yet few detailed accounts have reported this. Most observations on movement and spatial distribution of *E. c. corinna* are from the southern part of the range: the most recent findings suggest that the species makes southerly (temporary) extensions beyond its normal, mainly tropical and subtropical breeding range into the temperate areas of south-eastern Australia (Smithers 1983, Scheermeyer 1985, 1987). The only published record of a northerly movement is that of Straatman (1963) who noted "a few specimens" of *E. c. corinna* accompanying a large northerly flight of *Tirumala hamata hamata* (W.S. Macleay) near Ingham, northern Queensland, in February-April 1961. More recently, Scheermeyer (1987) noted two separate movements of *E. c. corinna*, one over sea between Palm Island and Magnetic Island (near Townsville) in March 1982 and another at Rockhampton in March 1983. Both flights apparently formed a minor part of a large south-easterly movement of *T. h. hamata* after heavy rainfall. It is perhaps of interest then that a spectacular, large-scale north-westerly flight of *E. c. corinna* was witnessed by the author in the Townsville district, northern Queensland, during mid-May to mid-June 1990. Counts across a 50 m transect over 2 min time intervals were made at James Cook University campus on 19.v., 28.v. and 9.vi. between 1200-1400 h.

Observations

Direction and duration of flight

On 19 and 20.v.1990 a mass movement of *E. c. corinna* was noticed in many suburbs around Townsville (19°16'S 146°49'E), and this may have been the start of the migration. Adults were observed moving rapidly in a WNW direction (i.e. parallel to the coast) and on 19.v. at 1330 h I estimated butterflies were moving at a rate of 20/50 m/2 min. The weather at this time

was warm and sunny with no cloud or wind and the flight continued at a steady pace over the next three days. From 24-27.v. the weather deteriorated markedly, being cloudy with light patches of rain, and no butterflies were observed flying during this period. On 28.v. conditions became warm and sunny with no wind or cloud and *E. c. corinna* commenced flying in very large numbers. Counts made on this day between 1323 and 1402 h yielded a mean of 65 ± 20 (s.d.) /50 m/2 min (n=10). This estimate extrapolates to 1,960/50 m/hr (95% confidence limits of sample mean 1,540-2,380). Over the next two days large numbers of butterflies continued flying WNW, but on 31.v. and for the next week conditions generally remained poor, being overcast with infrequent light showers. Little activity occurred during this period and the only movements noted coincided with patchy periods of sunshine. However, on 9.vi. the weather was warm and sunny, and at 1230 h small numbers (5/50 m/2 min) of *E. c. corinna* were in evidence again. Very few butterflies were observed moving over the next week and by 14.vi. the flight had ceased altogether despite favourable weather.

Feeding and Behavioural Activity

A pronounced diurnal shift in activity was noticed during the peak of the flight in late-May, though the direction of flight remained strictly WNW. Little movement occurred during the cooler hours of the morning (<9000) or late afternoon (>1600) and flight activity reached a maximum around midday. At Melton Hill, Townsville, large overnight 'camps' were found amongst shrubs and understorey vegetation in suburban gardens. During the early hours of the morning these camps would begin to dissociate as butterflies devoted much time to nectar feeding on a variety of flowers, including *Antigonon leptopus*, *Melaleuca viridiflora* and *Mangifera indica* (mango). Within several hours after dawn the butterflies had dispersed from these sites.

Reproductive Condition

On 29.v. a sample of female butterflies (n=18) was collected. Butterflies were frozen and then dissected to evaluate reproductive condition, mating state (by examination of the bursa copulatrix) and fat-body content. All females examined contained no eggs, showed no signs of ovarian development, were unmated (i.e. contained no spermatophore) and contained extensive fat reserves in the body cavity. Examination of the extent of wing damage, as an indication of relative age, revealed that most females (14 or 78%) were 'fresh' (0% scales missing), three (17%) were 'slightly worn' (1-5% scale loss) and one (5%) was 'worn' (6-25% scale loss).

Other Species

Several other butterfly species, notably *Danaus chrysippus petilia* (Stoll), *Tirumala hamata hamata* and *Anaphaeis java teutonia* (Fabricius), were noted moving in the same direction with *E. c. corinna* but in substantially lower numbers. *Badamia exclamationis* (Fabricius) had made its main annual

northerly flight several weeks earlier and there was little overlap in the timing of its movement with that of *E. c. corinna*.

Discussion

The observations made on directional flight, together with evidence on female reproductive condition, overnight clustering and early morning feeding behaviour strongly indicate that *E. c. corinna* is a migrant, and this attribute must now be considered a life history component of the species. Furthermore, several independent observations were made at Charters Towers (20°05'S 146°16'E), approximately 100 km inland from Townsville, where large numbers of *E. c. corinna* were noted moving approximately NW on 1 & 11.v. (R. Cumming, pers. comm.) and 9.vi. (J. Kennedy, pers. comm.). These observations coincide with the flights recorded at Townsville and, overall, suggest that a large-scale north-westerly migration of *E. c. corinna*, spanning some six weeks, occurred towards the end of the wet season along and near the north-eastern Queensland coast.

In the northern and north-eastern part of its range *E. c. corinna* forms large overwintering aggregations during the dry season (Kitching and Zalucki 1981, Monteith 1982, Jones 1987, Scheermeyer 1987). In Queensland, these clusters occur frequently along the eastern coast in sheltered microhabitats, such as in dense open forest and vine thicket patches along creeks, and adults remain reproductively dormant (Kitching and Zalucki 1981, Scheermeyer 1987). The aggregations reflect local contractions in distribution in response to the unfavourable dry months (Scheermeyer 1987), however, a migratory phase opens the intriguing possibility that such population movements of *E. c. corinna* may occur on a much wider, continental scale. Clearly, more detailed observations on movement, particularly at the wet-dry season interface, are needed and there is an opportunity to establish if a link exists between directional flight and overwintering.

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